

# Mule Deer Responses to Deer Guards

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**Highlight:** In this investigation the effectiveness of guards 12, 18, and 24 feet long in preventing mule deer from crossing vehicle openings in fences 8 feet high was evaluated. The guards were constructed of flat mill steel rails  $\frac{1}{2} \times 4 \times 120$  inches, and were tested under both controlled and field conditions. Under controlled tests, 16 of 18 deer successfully crossed the guard. Fifteen deer and one elk crossed guards under field conditions. Deer did not attempt wide jumps over the guards, but rather walked, trotted, or bounded across them. Use of this guard type under the condition tested is not recommended.

Fences 8 ft in height are frequently installed along primary highways where the possibility of collision between vehicles and mule deer (*Odocoileus hemionus hemionus*) is high. They are also established along perimeters of big game enclosures and enclosures. While these fences prevent many animals from going where not desired, a problem arises when it is necessary to permit vehicle access through the fences. When gates hinder vehicular traffic flow, structures such as modified cattle guards have been used and recommended. The physical requirements of guards to preclude deer or elk (*Cervus canadensis*) crossings have not been tested and neither deer nor elk responses to such structures have been documented.

The purpose of this investigation was to evaluate the effectiveness of three lengths of guards in preventing deer from

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crossing through vehicle openings in 8-ft fences.

## Methods and Materials

Two deer guards were installed in 8-ft fences, one adjacent to Interstate 70 near Avon, Colo., and the other in a Bureau of

Land Management wildlife enclosure fence at Trail Gulch between Dotsero and Burns, Colo. Both guards utilized 10 x 12 ft sections (Fig. 1) constructed with flat mill steel  $\frac{1}{2} \times 4 \times 120$ -inch (width, height, and length, respectively). The flat mill steel rails were perpendicular to the direction of traffic. The lengths of guard tested, 12, 18, and 24 ft, were measured parallel to the direction of traffic flow. The guard at Trail Gulch was used for controlled tests, while both were monitored for deer use under field conditions.

## Controlled Conditions

The Trail Gulch guard was constructed with two 10 x 12-ft sections for a total

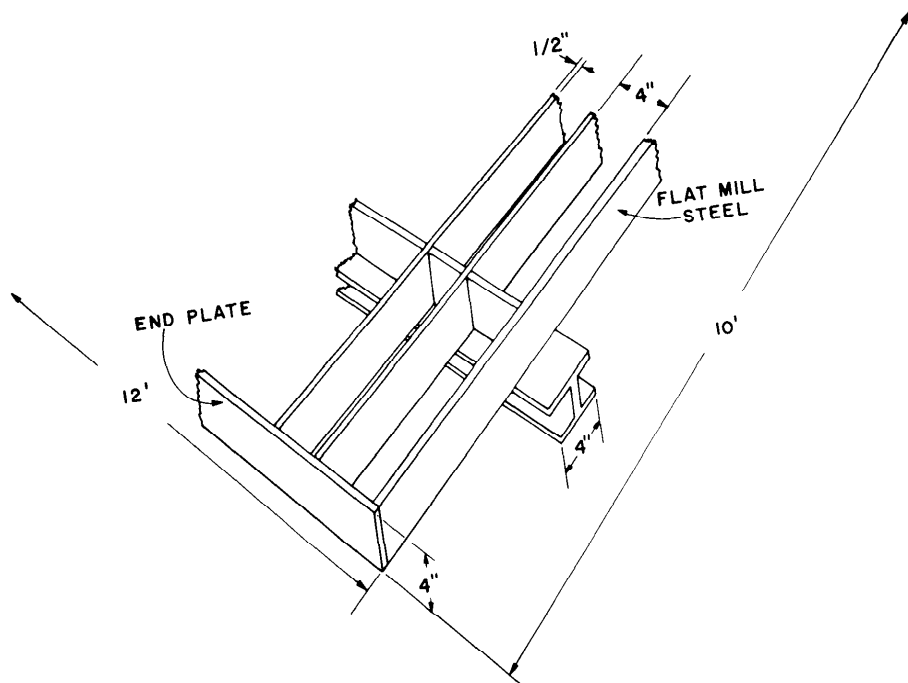


Fig. 1. Modified deer-cattle guard specifications.

Table 1. Responses of 16 mule deer to deer guards of 12, 18, and 24 ft at Trail Gulch.

Number	Length of guard (ft)	Time from release to completed crossing (sec)	Number of approaches <sup>1</sup>	Number of investigative instances <sup>2</sup>	Distance covered in first step or bound (ft)	Predominant mode of crossing	Sex/age <sup>3</sup>
1	12	110	3	—	—	trot	F/F
2	12	375	1	4	3.90	walk	F/
3	12	11	0	0	7.94	bound	F/
4	12	15	1	1	—	walk	F/
5	12	16	0	0	3.54	walk	F/
6	12	60	0	0	1.90	walk	M/
7	12	584	5	7	7.64	bound	M/F
8	12	37	1	3	5.28	trot	M/
9	12	95	1	4	6.00	bound	M/
10	18	27	0	2	3.61	trot	F/
11	18	16	0	1	3.21	trot	M/
12	18	1,017	197	16	3.67	walk	M/F
13	18	70	0	0	1.57	walk	M/F
14	18	217	6	9	6.59	bound	F/
15	24	84	2	3	2.66	trot	F/
16	24	27	0	0	6.33	bound	F/F

<sup>1</sup>Deer moved to guard as if to cross, then turned away.

<sup>2</sup>Refers to instances of investigative behavior (Scott, 1956) where the animal visibly made a sensory inspection by bending neck, moving ears forward, and looking at guard.

<sup>3</sup>Male or female is indicated by M or F before slash (/), Fawn is indicated by F after slash. All others were either yearling or mature.

length of 24 ft. A runway 10 ft wide and 59 ft long was constructed with 8-ft fencing at one approach to the guard.

To test a 12-ft guard, half of the 24-ft guard was covered with plywood and 2-3 inches of soil. To test 18-ft and 24-ft guards plywood sections were removed. The tests were handled in the same manner for all guard lengths.

The tests involved releasing deer in the runway and observing their response as they attempted to escape via their only exit across the guard. Each deer was released from an individual carrying crate (Bartmann and Steinert, 1970) as quietly as possible. The observer opened the crate, released the deer, then remained motionless until the animal crossed the guard. The time from release to complete guard crossing was measured with a stop watch. Other observations were noted mentally and recorded immediately after each test.

Eighteen deer of varying ages and both sexes were obtained from a winter trapping program. Ten of these animals were tested with the 12-ft guard, six with the 18-ft guard, and two with the 24-ft guard.

#### Field Conditions

The guard near Avon was 20 ft wide and 12 ft long. The Trail Gulch guard, except for 2 months during which the controlled tests were conducted, was 10 ft wide and 24 ft long. Periodic track counts were made on both approaches to the guards, and the guard rails were examined from October 6, 1972, to December 31, 1972, at Avon and from June 29, 1972, to April 19, 1973, at Trail Gulch. Any crossings or attempts to jump the guard were determined by closely examining the road for tracks and the guard rails for hoof scuff marks and deer hair.

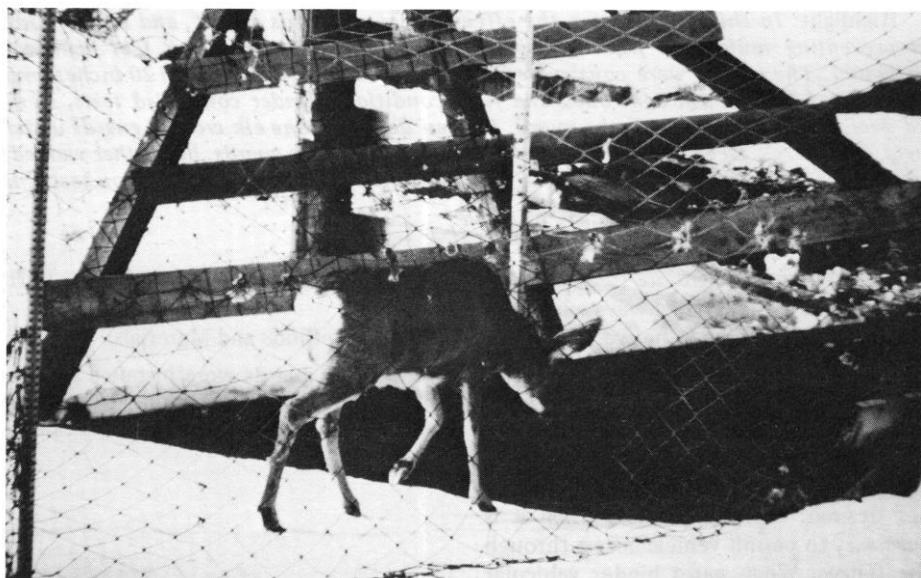


Fig. 2. Test deer Number 15 spent 84 seconds from release to having completed a crossing of the guard. During this time the animal completed three instances of investigative behavior, one of which is shown.

Table 2. Number of deer and elk crossings and number of tracks recorded during the field evaluations of the Avon and Trail Gulch deer guards.

Guard	Species	Number of crossings	Tracks when crossing <sup>1</sup>	Tracks when no crossings <sup>2</sup>	Minimum number crossings prevented <sup>3</sup>
Avon	deer	4	76	64	6
Trail Gulch	deer	11	94	151	5
	elk	1	2	4	3
Total		16	172	218	14

<sup>1</sup>The number of tracks at both ends of the guard when crossings occurred.

<sup>2</sup>The number of tracks at both ends of the guard when no crossings were detected. Animals making tracks appeared to have been prevented from crossing the guards.

<sup>3</sup>The number of days when at least one deer or elk made tracks near the ends of the deer guards and when no crossings occurred. At least one animal on each day was interpreted as having been prevented from crossing over the guard.

## Results and Discussion

### Controlled Conditions

Sixteen of the 18 test deer crossed the structures (Table 1). The mean ( $\pm S$ ) time from release to crossing was 172.6 ( $\pm 274$ ) seconds. The range of 11 to 1017 seconds was indicative of the variable responses observed (Fig. 2).

One question that prompted the study was how far would deer jump to clear guards. During our observations no deer seriously attempted to jump even the shortest guard (12 ft). The distance covered by each animal's first step or bound onto the guard averaged 4.56 ( $\pm 2.1$ ) ft with a maximum of 7.94 ft (Table 1). Although deer may be capable of running broad jumps of almost 30 ft (Severinghaus and Cheatum, 1956), they did not use this ability to cross barriers of the type tested.

Four of the 14 deer that crossed the 12- and 18-ft guards fell through the steel railings with all four legs. None of these animals were seriously injured. Their predominant response was to roll onto their sides, thereby getting their hooves onto the rails again. Apparently the dew claws prevented the animals from falling through more frequently (Fig. 3).

### Field Conditions

As determined by track counts, four deer crossed the Avon guard between October 6 and December 31, 1972. Eleven deer and one elk crossed the Trail Gulch guard from June 29, 1972, to April 19, 1973 (Table 2). None of these animals jumped even the shortest guard (12 ft). The tracks counted adjacent to the guards were probably not indicative of deer numbers present since one deer may make many tracks. However, tracks recorded without crossings represent at



**Fig. 3.** Dew claws may have prevented this deer from slipping into the guard. The dew claws on the right back leg appear to be spread and in contact with one of the guard rails.

least the presence of one deer each time it was checked, a total of which indicates a minimum number of crossings prevented (Table 2).

### Conclusions

Study results demonstrate that this modified deer-cattle guard had limited effectiveness in preventing deer movements through openings in 8-ft fences. Deer did not attempt extensive jumps of 12-, 18-, or 24-ft guards when moderately to highly motivated, but rather walked, trotted, or bounded across them. Little advantage was gained by extending the

length of the guard beyond 12 ft. The use of modified deer-cattle guards (of the type used in this study) for precluding deer movements through openings in 8-ft fences should be avoided.

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